# ICE NGX Clearing and Risk Guidebook

## Version 2.7.2

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# Clearing and Risk Guidebook

# 1. Introduction

Please see ICE NGX's Disclosure pursuant to the Principles for Financial Market Infrastructures Disclosure Framework, available under the Clearing tab on the Resources page of the ICE NGX website (**www.ice.com/ngx/resources**), for an overview of ICE NGX's history, operations and regulatory environment.

## 1.1. Disclaimer

This document is intended for information purposes only to provide background on ICE NGX and its clearing and settlement operations. This document does not outline, indicate, suggest or form part of, and should in no way be construed to outline, indicate, suggest or form part of, the terms and conditions under which ICE NGX and Contracting Parties agree to conduct business. For such information, parties should refer to the ICE NGX Contracting Party's Agreement.

# 2. Clearing

## 2.1. Overview

ICE NGX is the pre-eminent clearinghouse for cleared North American physically-settled futures contracts in environmental products, natural gas, and electricity and financially-settled futures contracts in Canadian electricity transacted through the ICE Trading Platform. In this role, ICE NGX must maintain a secure and efficient clearing operation, managing various risks across many diverse market participants and products.

ICE NGX acts as the central counterparty ("CCP") for all cleared transactions. This makes ICE NGX the buyer to every seller, and the seller to every buyer. This provides for full cycle anonymity,[1] and introduces a third party into the transaction that is neutral and obligated to ensure the performance of the transaction.

[1] ICE NGX offers trading and clearing services for products at a small number of natural gas delivery points in the U.S. under the "assigned delivery" model. In contrast to all other ICE NGX delivery points, under the assigned delivery model ICE NGX does not schedule, or nominate, the transacted natural gas to effect physical delivery. Rather, at the appropriate time, ICE NGX matches volumes transacted at particular delivery points, and the counterparties arrange for scheduling, or nominating, to effect physical delivery.


As each Contracting Party agrees to make ICE NGX the CCP to all cleared transactions, the Contracting Parties collectively look to ICE NGX to manage any risks to the ongoing operation of the clearinghouse.

ICE NGX manages clearing risks using a combination of the following items which are explored in further detail in this document:

- Standardized Rules – All Contracting Parties are subject to the same rules under the CPA.
- Settlement Bank – ICE NGX's settlement bank provides a daylight and overnight facility to support daily and monthly settlements.
- Guarantee Fund – ICE NGX self-funds a guarantee fund for Contracting Parties to access in the event of an exchange default.
- Backstopping – Physical delivery risks are mitigated through the use of backstopping services.
- Collateral Provisions – Margin Requirements are covered by collateral, in the form acceptable to ICE NGX.
- Liquidation Rights – ICE NGX has liquidation/acceleration rights if a Contracting Party defaults.

ICE NGX is committed to ensuring the security and integrity of the clearing operation. ICE NGX and its subsidiaries do not enter into transactions nor take positions in energy products for any reason other than to provide clearing services.

## 2.2. CCP Clearing Benefits

CCP clearing facilitates anonymous trading by placing ICE NGX between the buyers and sellers as a common counterparty. In addition to anonymity, CCP clearing affords the following key benefits:

### 2.2.1. Neutral, Independent Risk Management

ICE NGX is impartial and the nature of the clearing business provides a strong incentive to maintain a default-free clearing operation. Furthermore, ICE NGX is not a market participant, does not take a market view, and earnings are not directed by commodity prices.

### 2.2.2. Centralized Collateral Requirements

Clearing through ICE NGX affords the most efficient allocation of collateral for participants by providing single point access to a large number of counterparties.

### 2.2.3. Counterparty Netting Facilities

CCP clearing and standardized netting rules create an environment to net physical and financial exposures across multiple counterparties and locations/instruments.

## 2.3. Performance Risks

ICE NGX's clearing and risk management structure exists to assure the continued performance of all contractual obligations in the event of a Contracting Party performance default. Contractual defaults are detailed in the CPA, with the key performance risks summarized as follows:

### 2.3.1. Failure to Make/Take Delivery

For physical natural gas contracts, the failure by a Contracting Party to deliver natural gas sold, or to take natural gas bought, would result in an ICE NGX imbalance with the pipeline or hub operator. In this event ICE NGX has the authority to procure alternate gas supplies or alternate gas markets to rectify the imbalance, or to financially settle the obligation failed upon.

For physical power products, the failure by a Contracting Party to deliver power sold, or to take power bought, would result in an ICE NGX imbalance with the independent system operator. In this event ICE NGX will financially settle the obligation failed upon to rectify the imbalance. If ICE NGX has advance notice of an expected failure to make or take delivery of physical power, ICE NGX has the authority to procure alternate power supply or alternate power markets to rectify the imbalance, or to financially settle the obligation failed upon.

For physical environmental products, the failure by a Contracting Party to deliver environmental credits sold, or to take environmental credits bought, would result in an imbalance between the quantity of environmental credits delivered to ICE NGX and the quantity of environmental credits that ICE NGX is obligated to deliver. In this event ICE NGX has the authority to procure replacement credits or financially settle the obligation failed upon to rectify the imbalance.

### 2.3.2. Physical Backstopping

Natural gas delivery risks are mitigated through the use of backstopping services provided by various market participants, including storage facilities, large shippers, and pipeline operators. Backstopping is typically an arrangement for immediate provision of supply/market at a pre-determined price (usually based on index).

With respect to environmental credits, ICE NGX may acquire additional credits from market participants to rectify delivery failures.

### 2.3.3. Financial Backstopping

Environmental, natural gas or power delivery issues may also be resolved through financial settlement, to compensate the affected Contracting Party for the volume of the underlying commodity that was not delivered or taken for delivery as contracted. A trade record is retroactively entered in the ICE NGX system whereby the undelivered volume is bought or sold at the prevailing market price.

Additionally, ICE NGX utilizes various risk models to size the financial resources and conducts stress testing and backtesting to ensure adequacy of the model performance.

### 2.3.4. Failure to Pay

The failure by a Contracting Party to pay for environmental credits, natural gas or power purchased or for an out-of-the-money financial contract at the time of settlement would result in ICE NGX drawing on the credit facility provided by ICE NGX's settlement bank. In this event, ICE NGX has the authority to draw on the collateral provided by the defaulting Contracting Party to repay the credit facility advance.

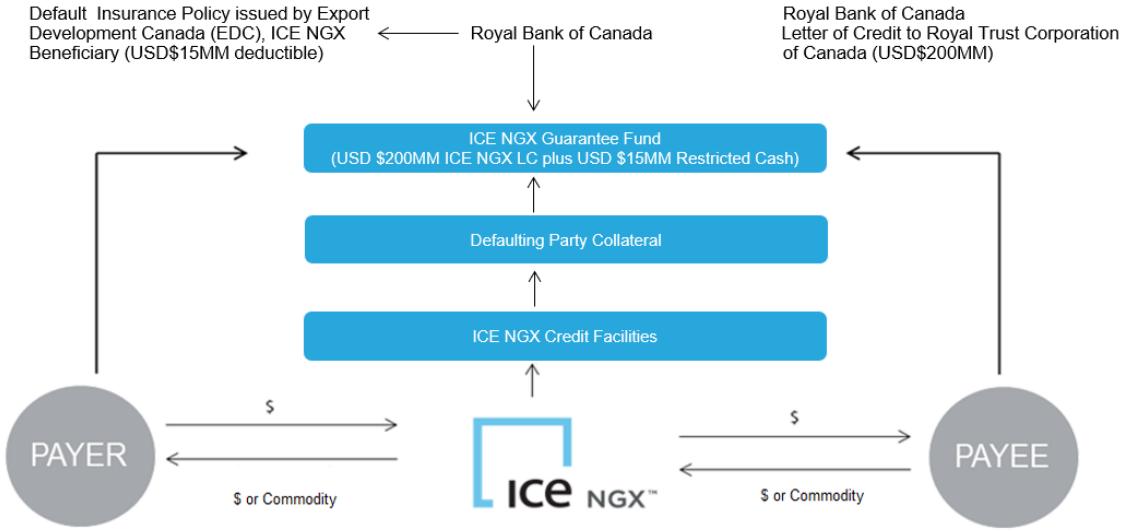
### 2.3.5. Failure to Provide Eligible Collateral Support

The CPA sets out the acceptable forms of collateral ("Eligible Collateral Support" - see below). The failure by a Contracting Party to provide Eligible Collateral Support with ICE NGX, in the amount required by ICE NGX, may result in insufficient collateralization of the Contracting Party's Obligations under the CPA, and is a "Default" under the CPA. In this event, ICE NGX is has the authority to ensure that the defaulting Contracting Party is unable to increase their risk position to the point where they bring unsecured risk to the clearing operation. This can be managed through trading restrictions or through liquidation of the Contracting Party's portfolio, where necessary.

### 2.3.6. Close Out Procedures

Under the ICE NGX Contracting Party Agreement and applicable laws in Canada and the U.S., ICE NGX has rights and authority to liquidate portfolios, close-out positions and accelerate payment obligations under all contracts cleared by ICE NGX to mitigate potential credit risk and delivery risks posed by Contracting Parties.

## 2.4. Clearing Capital and Settlement Structure



ICE NGX has designed the non-mutualized clearinghouse and guarantee fund structure illustrated above to withstand a Contracting Party default. ICE NGX has the following lines of defense against a payment default by a Contracting Party:

1. Immediate Intraday/Overnight Liquid Credit Facility from ICE NGX
    - Settlement Banking Credit Facility
2. Financial Resources from Defaulting Contracting Party and ICE NGX
    - Defaulting Party Collateral
    - ICE NGX Financial Resources
    - ICE NGX Guarantee Fund

### 2.4.1. Settlement Banking Credit Facility

Exchange's Principal Banker (as defined in the CPA) acts as its primary settlement bank, custodian of cash collateral held in segregated accounts at the bank for the benefit of the Contracting Party that provided the collateral, acts as advising bank to ICE NGX on all letters of credit provided as collateral, and provides credit facilities to help ICE NGX manage settlement payment flows.

Exchange's Principal Banker provides the following intraday and overnight credit facilities to facilitate inflows and outflows of settlement payments, each available for drawing in CAD or USD:

- USD $100 million committed intraday and overnight facility, and
- USD $200 million uncommitted intraday facility.
- Financial Resources from Defaulting Contracting Party and ICE NGX

### 2.4.2. Defaulting Party Collateral

Exchange's Principal Banker provides custody of the collateral deposited by Contracting Parties and provides view access to Contracting Parties as directed by ICE NGX. In the event of a Default by a Contracting Party under the CPA - including a late or missed settlement payment by the Contracting Party - ICE NGX has authority to draw on the collateral of the defaulting Contracting Party.

### 2.4.3. ICE NGX Financial Resources

ICE NGX maintains sufficient financial resources to cover 12 months of operating costs along with the value of the single largest potential collateral shortfall based on stress testing results for extreme but plausible stress case scenarios.

### 2.4.4. ICE NGX Guarantee Fund

The ICE NGX Guarantee Fund resources are available for disbursement to meet ICE NGX's obligations as a central counterparty within a 1-day settlement cycle. The ICE NGX Guarantee Fund comprises:

- USD $15 million on deposit with Exchange's Principal Banker and held as restricted cash to fund the USD $15 MM first loss amount under the default insurance policy provided by Export Development Canada (the "Net Receivables Policy"), and
- USD $200 million,
    - in the form of a letter of credit issued at the request of and for the account of ICE NGX and in favour of the Escrow Agent (Royal Trust Corporation of Canada), accessible to non-defaulting Contracting Parties through the CPA and the Deposit Agreement in the event of an ICE NGX default, and
    - backed by the Net Receivables Policy for a maximum coverage amount of USD$200 million in addition to the first loss amount. This default insurance is an eligible financial resource under CFTC regulations applicable to DCOs.

In the case of a failure to make/take delivery of environmental credits, natural gas or power, ICE NGX may use physical or financial backstopping arrangements.

### 2.4.5. Stress testing

ICE NGX utilizes a wide range of relevant stress scenarios in determining stress testing results under extreme but plausible conditions on a daily basis. Should results yield potential uncovered losses in excess of ICE NGX Financial Resources, ICE NGX may take one or more of the following remedial actions.

1. Increase initial margin;
2. Implement position limits; and/or
3. Increase its Financial Resources.

### 2.4.6. Backtesting

Backtesting compares initial margins against changes in historical settlement prices. ICE NGX conducts backtesting on a daily basis at product, portfolio and collateral levels. Portfolio backtesting results are reviewed by a third party on a quarterly basis. If backtesting yields unexpected or negative results, initial margin rates may be adjusted and/or the model may be adjusted.

# 3. Margin and Collateral

## 3.1. Margin Triggers

1. If the Initial Margin Requirement for a Contracting Party reaches 80% of Net Equity (i.e., Initial Margin Requirement / Net Equity >= 80%), ICE NGX may request additional collateral.
2. If the Initial Margin Requirement for a Contracting Party reaches 90% of Net Equity, ICE NGX may restrict the Contracting Party's trading permission until the Contracting Party deposits additional collateral, and/or the Initial Margin Requirement falls below 80% of Net Equity.
3. If the Initial Margin Requirement for a Contracting Party reaches 100% of Net Equity, ICE NGX may invoke the Liquidation and Close-out Procedures under the CPA.

4. If the Available Margin falls below the minimum required margin amount - $500 thousand for a Contracting Party that trades environmental products, $500 thousand for a Contracting Party that trades natural gas products, or $1 million for a Contracting Party that trades power products, or $2 million for a Contracting Party that trades Option products - ICE NGX may request additional collateral.

Once the previous month net account payable by ICE NGX to the Contracting Party no longer constitutes collateral (see below under Forms of Collateral), ICE NGX may request additional collateral to ensure the Contracting Party has sufficient collateral with ICE NGX to meet both the minimum required margin amount and the 80% Equity threshold.

When requesting additional collateral, ICE NGX will typically recommend a collateral amount which will reduce the Contracting Party's position below 80% of Net Equity utilization, and will provide room for further trading activity. If the Contracting Party's Initial Margin Requirement reaches 100% of Net Equity and ICE NGX makes a request for additional collateral prior to 9:00 AM Eastern Time on a business day that is not a recognized banking holiday, the Contracting Party is required to provide eligible collateral support within the same business day. Otherwise, the Contracting Party is required to provide additional collateral by the next business day or, if the next business day is a banking holiday that is recognized by major Canadian and/or United States banks, on the first business day that is not a recognized banking holiday following any such request, unless ICE NGX specifies that the margin call must be met within a shorter timeframe.

If a Contracting Party is deemed to present additional risk of loss to or significantly impair the risk of ICE NGX, ICE NGX may, at its sole discretion, take reasonable actions to limit the risk, including, but not limited to, requesting additional collateral, restricting trading permission, or invoking liquidation procedures.

## 3.2. Collateral Policy

The CPA, in particular Schedule "C" - Risk Management Policy, requires that each Contracting Party post sufficient collateral, in any combination of the eligible forms of collateral, to cover its Margin Requirement. A Contracting Party's collateral supports the positions of only the Contracting Party for which it was provided and each of its Contracting Party Affiliates, and can only be used to remedy a performance failure by the Contracting Party or by any of its Contracting Party Affiliates.

Please refer to section 4) for a complete breakdown of the components that make up the Margin Requirement.

### 3.2.1. Forms of Collateral

Collateral posted with ICE NGX may take any of the following forms, and may be denominated in either CAD or USD.

1. An irrevocable standby letter of credit issued by an Approved Financial Institution acceptable to ICE NGX;
2. Cash held in an operationally segregated account at Exchange's Principal Banker;
3. A previous month net account payable by ICE NGX to the Contracting Party, provided that such previous month account payable will only constitute collateral until the 20th day of the settlement month for physical contracts;
4. A current month accounts payable by ICE NGX to the Contracting Party;

5. A net positive MTM Settlement and/or a net positive Futures Settlement APAR
6. A positive variation margin amount (i.e., in the money position), until such time as the variation margin is no longer positive, or until the position converts from a variation margin amount to an A/P or A/R.

### 3.2.2. Letter of Credit Limit

Letters of credit (LCs) posted as collateral must name ICE NGX as the sole beneficiary and be in a form acceptable to ICE NGX. ICE NGX accepts LCs only from issuing banks that have been pre-approved by ICE NGX (each an "Approved Financial Institution"), and manages LC-collateral related exposure through limits on the size of each LC and exposure to each Approved Financial Institution. ICE NGX's standard form of LC, the list of Approved Financial Institutions and a description of the LC-collateral limits are available in the ICE NGX Collateral and Treasury Policy, available under the Clearing tab on the Resources page of the ICE NGX website (**www.ice.com/ngx/resources**).

### 3.2.3. Request for Collateral by Exchange

Given that the margin requirement changes dynamically as market prices change and additional trades are consummated, ICE NGX manages the collateral requirements of each Contracting Party on a portfolio basis in real time. There are several key triggers that ICE NGX may use to manage a Contracting Party's collateral position.

### 3.2.4. Return of Collateral

A Contracting Party may request a return of some or all of its collateral if its Initial Margin Requirement is less than 80% of Net Equity. ICE NGX agrees to return excess collateral in accordance with the CPA, and such collateral return is processed on the next business day or, if the next business day is a recognized banking holiday, as defined above, on the first business day that is not a recognized banking holiday following any such request.

# 4. Margin Requirements

## 4.1. Margin Requirement

ICE NGX's risk measurement model is based on quantifying the default risk of a Contracting Party as a monetary value. This monetary value is known as the Margin Requirement, which represents a measurement of the probable exposure that a Contracting Party's portfolio might bring to the clearing operation in the event of a default by the Contracting Party.

The Margin Requirement is made up of the sum of the following three components:

1. Accounts Receivable ("A/R") Risk - the value of gas, power, and environmental products already delivered that generates a net amount owing to ICE NGX, as applicable
2. Variation Margin - the mark-to-market gains or losses of a portfolio of trades resulting from price movements;
3. Initial Margin - a buffer charged to account for potential adverse changes in market prices, as well as other risk concerns, during a liquidation scenario.

## 4.2. Calculating Accounts Receivable Risk

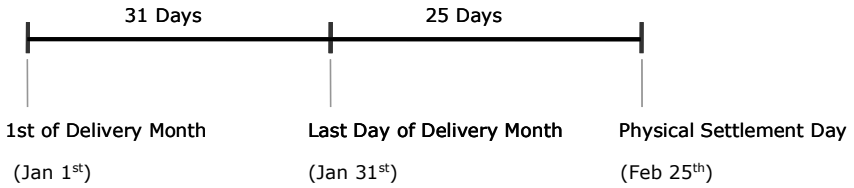
While many ICE NGX products involve physical delivery as a component of settlement, all of the products offered by ICE NGX through the clearing operation culminate in a financial settlement. The financial component of settlement requires the clearing operation to transmit the net settlement payments between Contracting Parties. In the process of this transmission, there is risk that monies owed by any Contracting Party (i.e., A/R) are not paid in full and/or on-time. Measuring the A/R risk resulting from settlement requires isolating the different cycles during which the risk exists.

ICE NGX currently maintains six A/R cycles for which it measures exposures to the payment from Contracting Parties. These cycles are differentiated by the duration of time for which the receivable is a known value.

All settlement payments are due by 2:00 PM ET on the corresponding settlement date.

### 4.2.1. Physical Natural Gas A/R Cycle

Physical Natural Gas contracts are settled on the 25th day of the month following delivery (unless the 25th falls on a weekend or Canadian statutory holiday, in which case the date is the next business day).



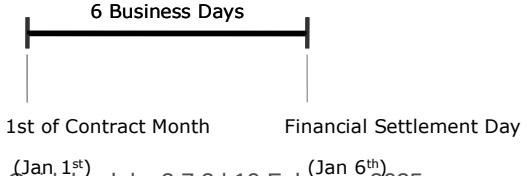

### 4.2.2. Total Physical Natural Gas A/R

The Total Physical Natural Gas A/R for physical natural gas products is the total value of the gas purchases taken over the course of the Physical Natural Gas A/R Cycle, less the total value of the gas sales delivered over the same cycle for each Contracting Party. This is mathematically represented as follows:

*Total Physical Natural Gas A/R = (Purchase Quantity – Sales Quantity) x Weighted Average Price x Duration (# days)*

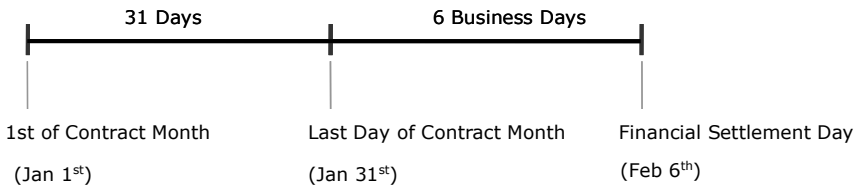
### 4.2.3. Financial Monthly Index A/R Cycle

Financial contracts that are settled against a monthly index are settled in the same month for which they were traded (i.e., a June contract would settle in June). The Financial Monthly Index A/R Cycle begins at the first of a calendar month (or upon publication of the relevant monthly index) and continues until settlement day of that month (which, by ICE NGX rules, occurs on the sixth Canadian business day of the month).



### 4.2.4. Financial Daily Index A/R Cycle

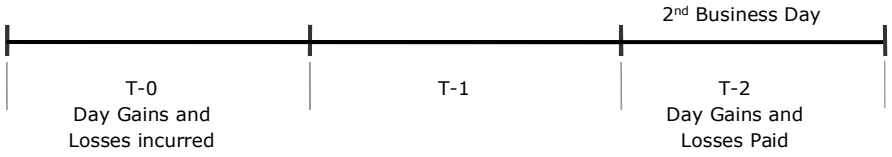
Financial contracts that are settled against a daily index are settled in the month following the month for which they were traded (i.e., a June contract would settle in July). The Financial Daily Index A/R Cycle begins at the first of a calendar month and continues until settlement day of the following month (which, by ICE NGX rules, occurs on the sixth Canadian business day of the following month).



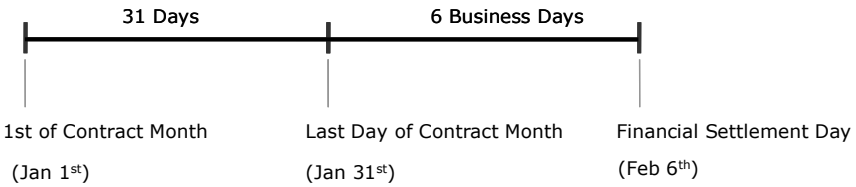

### 4.2.5. Financial Daily Index A/R Cycle - Daily MtM Settlement Power

Mark-to-Market (MtM) for Canadian financial power contracts are settled in two parts.

1. Daily MtM is settled on the second business day following the date MtM was incurred based on the ICE NGX daily settlement price.




2. The System Operator (AESO or ISO) pool price true-up is settled in the month following the month for which they were traded (i.e., a June contract would settle in July).



### 4.2.6. Regulated Rate Option ("AB FLR RRO%) A/R Cycle

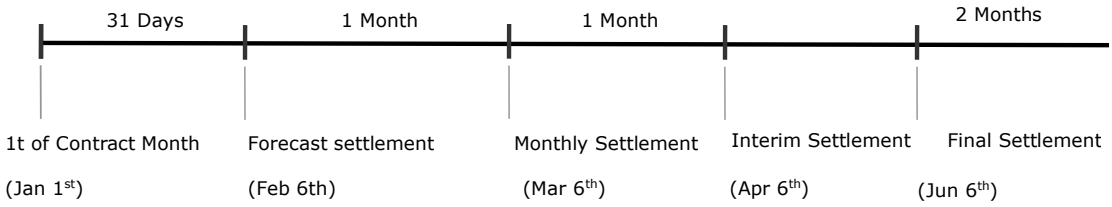
AB FLR RRO% contracts are unique from other financial products, as there are four settlement periods (forecast, monthly, interim, final). For clarity, the AB FLR RRO% product is subject to daily MtM settlement power cycle described above (cycle No. 4).

The first (forecast) AB FLR RRO% settlement period begins on the first of a calendar month, and continues until settlement day one month later (i.e., a January position would have a forecast settlement on the sixth business day in February). This settlement, however, is only a close estimate as to the final contract value, which is why there are three subsequent settlement periods. As there is always a risk to ICE NGX that the forecast settlement amount may be insufficient, 5% of the absolute value of the outstanding AP/AR amounts is held against a customer's collateral. On the 1st day following the contract month, 5% of the contact value is also held against collateral.

The second (monthly) AB FLR RRO% settlement period begins on the first of the month, one month following the forecast settlement. Any discrepancies between the forecast and monthly settlement amounts are settled on the sixth business day of the first month following the forecast settlement (i.e., a January position would have a monthly settlement on the sixth business day in March).

The third (interim) AB FLR RRO% settlement period begins on the first of the month, two months following the monthly settlement. Any discrepancies between the forecast and monthly settlement amounts are settled on the sixth business day of the first month following the monthly settlement (i.e., a January position would have an interim settlement on the sixth business day in April).

The fourth (final) AB FLR RRO% settlement period begins on the first of the month, two months following the interim settlement. At this point, power usage data is finalized and any discrepancies are settled on the sixth business day of the second month following the interim settlement (i.e., a January position would have a final settlement on the sixth business day in June).




### 4.2.7. Total Financial A/R

Determining the Total Financial A/R for financial products requires the calculation of the Future Clearing Amount, which results when the fixed amount of the financial contract is subtracted from the floating amount:

*Future Clearing Amount = Floating Amount – Fixed Amount.*

A positive Future Clearing Amount is paid by the buyer and conversely a negative Future Clearing Amount is paid by the seller. The Total Financial A/R is then:

*Total Financial A/R = Financial Monthly Index Future Clearing Amount + Financial Daily Index Future Clearing Amount + RRO Future Clearing Amount*

### 4.2.8. Physical Power A/R Cycle

Physical Power contracts are settled on the 25th day of the month following delivery (unless the 25th falls on a weekend or Canadian statutory holiday, in which case the date is the next business day).

The Total Physical Power A/R for physical power products is the total value of the power purchases taken over the course of the Physical Power A/R Cycle, less the total value of the power sales delivered over the same cycle for each Contracting Party.

This is mathematically represented as follows:

*Total Power A/R = (Purchase Quantity – Sales Quantity) x Final Price x Duration (#hours)*

### 4.2.9. Physical Environmental A/R Cycle

Physical Environmental products are settled on the 20th calendar day of the month (unless the 20th falls on a weekend or Canadian statutory holiday, in which case the date is the next business day).

The Total Physical Environmental A/R is the total value of the environmental product purchases taken over the course of the Physical Environmental A/R Cycle, less the total value of the environmental product sales delivered over the same cycle for each Contracting Party.

This is mathematically represented as follows:

*Total Environmental A/R = (Purchase Quantity – Sales Quantity) x Weighted Average Price x Duration*

The deadline for the seller to deliver to the ICE NGX registry account is the 5th business day of the Environmental Settlement Month. The deadline for ICE NGX to deliver to the buyer's registry account is the 10th business day of the Settlement Month.

The full Physical Environmental AP/AR amounts are reflected for both the buyer and the seller immediately following the 5th business day (deadline for the seller to deliver) of the Environmental Settlement Month for both buyer and seller.

The Physical Environmental A/R for the buyer will be margined until the A/R obligation is satisfied on the respective Physical Environmental Settlement Date. Similarly, the Physical Environmental A/P amount will be credited to the seller's account until the A/P is settled on the respective Environmental Settlement Date.

## 4.3. Calculating Variation Margin (mark-to-market)

All products listed on ICE NGX or that are cleared through ICE NGX allow buyers and sellers may enter into the economics of forward *purchase* positions ("long positions") or the economics of forward *sale* positions ("short positions") for a particular time period in the future.

For every future position, there is a cost of liquidating such trade that is based on the prevailing market price at the time of liquidation (commonly referred to as mark-to-market). ICE NGX accounts for this mark-to-market risk by calculating variation margin.

On a near real-time basis, ICE NGX's systems automatically calculate mark-to-market variation gains and losses for all positions, both physically settled and financially settled products, and automatically post the variation gains and losses in near real-time to the Contracting Party's account. ICE NGX staff use the Real-Time-Risk report in the Clearing System for monitoring and margining.

ICE NGX applies its accrual variation margin methodology for all physically settled products. Accrued variation margin is calculated as the position size times the difference between mark-to-market price and the original traded price. Variation accruals are calculated and posted to the Contracting Party's account in near real time by ICE NGX's systems, from the time the transaction is reflected in ICE NGX's systems and continuously until the natural expiry date of each contract.

- Before contract expiry, accrued variation gains and losses are fully collateralized but not settled.
- After contract expiry, variation accruals are replaced by AP/AR notional value for the delivered products. AP/AR is fully collateralized until settled on the corresponding settlement date as described in section 3.1.1.

ICE NGX daily settles all variation gains and losses on Canadian financial power products each business day on a T+2 basis. Daily settled variation margin is calculated as the position size times the difference between mark-to-market price and

- the last settlement price, if the transaction occurs prior to the last settlement, or
- the original traded price, if the transaction occurs after last settlement.

Variation margin includes two components: offset gain/loss and open Variation Margin.

### 4.3.1. Offset Gain/Loss

Any long/short positions that are offset by the opposite short/long position in an equivalent contract for a given day in the future comprise the *offset position*.

Offset positions result in a known (crystallized) gain or loss being applied to the margin requirement for each Contracting Party. If a Contracting Party purchased a position at a price lower than they sold the opposing position in an equivalent contract, they are marked with a gain in the amount of the difference between the two values. Conversely, if a Contracting Party purchased a position at a price higher than they sold the opposing position in an equivalent contract, they are marked with a loss in the amount of the difference between the two values. This difference comprises the offset gain/loss portion of the variation margin.

For clarification, offset positions are not closed out or legally settled until their natural expiry.

*Offset Gain/Loss = Min(Purchase Quantity, Sale Quantity) x (Selling Price – Purchase Price) x Duration (# days)*

### 4.3.2. Open Variation Margin

The net of the long and short positions for a Contracting Party for a particular day comprises the *net open position* of that Contracting Party for that day.

The exposure to net open positions held by a Contracting Party is calculated by determining the difference between the value of the net open position at the time it was consummated or last settled, and its estimated value in the current market (mark-to-market), as follows:

*Open Variation Margin for Net Buyer = (Market Price - Purchase Price) x Quantity x Duration (# days)*

*Open Variation Margin for Net Seller = (Sale Price – Market Price) x Quantity x Duration (# days)*

*Note: For electricity contracts the duration is given in hours.*

***Net Buyers***

If the net open position of a Contracting Party is comprised of purchases, and those purchases were consummated or last settled at a price lower than the current market price for that position, the Contracting Party is marked with a gain in the amount of the difference between the two values. A loss will be marked if the net open purchase position was consummated or last settled at a price higher than the current market price.

***Net Sellers***

If the net open position of a Contracting Party is comprised of sales, the converse of the above is true; a gain is marked when the sale price is higher than the current market price, and a loss is marked where the sales price is lower than the market price.

### 4.3.3. Market Prices

The calculation of variation margin requires the establishment of a market price. ICE NGX determines market prices in real-time as instruments are traded through its trading system, or through the establishment of closing (settlement) prices. It is important to note that net open position mark-to-market is an *estimate* of the value of the net open position in the current market, relying on the most current information available as the basis for the estimate.

## 4.4. Calculating Initial Margin

In the event of a performance failure by a Contracting Party, it may be necessary for ICE NGX to liquidate the portfolio of the failing party. The liquidation process removes the market price risk from the failing party's portfolio of open positions and quantifies the risk into an offset gain or loss.

It is possible that the price at which liquidation trades are made may vary from the estimated current market price that is used in the variation margin calculation. This can be defined as the liquidation risk, or market price risk, that ICE NGX faces during the liquidation of a position. The mechanism

used to mitigate this risk is the calculation of initial margin as part of the margin requirement. The initial margin acts as a buffer to account for changes in market prices during a liquidation scenario.

Initial margin is calculated by assessing the actual price movements that have occurred in recent history of each product, then applying a Value at Risk ("VaR") model to determine the probability of those price movements occurring during a liquidation period. Initial margin is the result of applying this probability to the current market price of each product for each forward date, and is an estimate of the risk within a certain confidence level.

### 4.4.1. Model Description

ICE NGX uses a weighted historical simulation based VaR calculation at the portfolio level. The portfolio VaR calculation is repeated for each commodity class within a portfolio. Commodity classes provide the ability to segment certain product categories to limit cross-commodity offsetting. Chargebacks are added for conservatism to account for correlation breaks, low liquidity and new markets.

$$Portfolio\ Margin\ Requirement = \sum_{j=1}^{all\ commodity\ classes} (Portfolio\ level\ VaR_j + \sum_{i=1}^{3} CB_{i,j})$$

Positions (product-tenor combinations) must individually meet ICE NGX specified minimum data quality standards to be included in the portfolio VaR calculations. For positions excluded from the portfolio-level VaR calculation, a product-level IMR will be calculated and added to the total margin requirement. For excluded positions no margin reductions will be provided for risk reductions toward other positions.

### 4.4.2. Model Configuration

ICE NGX configures settings within the model tools to ensure an appropriate amount of conservatism exists to ensure consistently high standards of portfolio margin performance will continue to be met. ICE NGX configures the model parameters to target portfolio-level performance not less than 99% within the reviewed historical data set. The historical data set consists of not less than 2 years of price history and a designated period of stress market conditions. The data is refreshed at least twice monthly.

### 4.4.3. Portfolio-level VaR Calcuation

ICE NGX utilizes a non-parametric VaR calculation at the portfolio level based on an age-weighted historical simulation approach widely known as the BRW model (Boudoukh, et al., 1998). Daily portfolio value changes are estimated given current portfolio composition and historical returns for each product and future tenor within the portfolio.

The Historical VaR is estimated directly using the percentile of the empirical distribution, 99%. ICE NGX prorates the result to a 2-day holding period.

### 4.4.4. Foreign Exchange Exposure Margin

For portfolios with product currency compositions that differ from the collateral posted currency, ICE NGX utilizes a historical Expected Shortfall model to capture the CAD:USD exchange rate volatility. The historical expected shortfall is calculated using 2 years of historical data with a 99% confidence interval over a two day hold period.

### 4.4.5. Shortfall Margin

Shortfall margin is designed to protect against the risks associated with Contracting Parties, as aggregated by clearing accounts, building up exposure beyond their credit capacity. The shortfall margin amount for a clearing account is the amount by which the clearing account's uncollateralized stress exposure exceeds the clearing account's shortfall allowance. The uncollateralized stress exposure is the largest stress loss minus portfolio margin.

### 4.4.6. Stress Loss Charge

In the event that a clearing account's financial resources stress exposure exceeds the guarantee fund, Stress Loss Charge is applied to cover the excess. Stress Loss Charge is calculated and added to the clearing account's initial margin requirement on a daily basis.

### 4.4.7. Discretionary Margin

ICE NGX may require a Contracting Party to provide Discretionary Margin, as additional initial margin requirement, to protect the financial integrity of the clearinghouse. Discretionary Margin can be applied either as a fixed dollar amount or as a margin multiplier.

### 4.4.8. Delivery Margin

Delivery margin applies from the 1st calendar day to the 5th business day of the Environmental Settlement Month to the Contracting Party's net deliverable sales position for each environmental product (i.e., each Vintage for each of Offsets and EPCs), to safeguard against the risk of default during the delivery period.

### 4.4.9. Environmental Products - Early Delivery

The Seller under an Alberta Environmental Product may deliver the credits prior to the contract expiry date ('early delivery"), as early as the 6th business day of the contract expiry month. Upon delivery (including early delivery), right and title to the credits is passed from the Seller to ICE NGX, who will hold the credits until delivered to the buyer after the contract expires. Accordingly, once confirmed, early delivery is satisfaction of the seller's obligations to deliver EPCs or Offsets that it has contracted to sell. Because the Seller's delivery obligations are satisfied, early-delivered volumes are exempted from certain margin requirements.

Upon confirming an acceptable delivery, the ICE NGX Market Operations team will update ICE NGX's systems to reflect that the seller's delivery obligation is satisfied. At that point, ICE NGX's systems will exempt the confirmed early-delivered quantity from the following otherwise applicable margin requirements:

- Portfolio Margin Requirement.
- Stress Testing Calculation
- Shortfall Margin Requirement, if any
- Stress Loss Charge, if any
- Delivery Margin Requirement

## 4.5. Margin Example 1 (Natural Gas)

The following example illustrates how ICE NGX's margin model applies to a specific set of trades.

***Example Trade – Fixed Price Contract***

- On March 27, 2017, BUYCO (buyer) purchases 5,000 GJ/Day of the ICE NGX AB-NIT month of April 2017 physical contract from SELLCO (seller) at a price of CAD $3.000/GJ.

***Position Management***

- As soon as the transaction is matched, BUYCO shows a net long position of 5,000 GJ a day from April 1 to April 30, 2017, thus a total net long position of 150,000 GJ (5,000 GJ/Day x 30 days).
- Conversely, SELLCO shows a net short position of 5,000 GJ a day from April 1 to April 30, 2107, thus a total net short position of 150,000 GJ (5,000 GJ/Day x 30 days).

***Initial Margin***

- Immediately following the creation of the long and short positions, initial margin is applied.
- Initial margin calculation will be applied at the portfolio level. All natural gas positions that qualify ICE NGX's portfolio margining standards will be considered together.
- The initial margin requirement will remain in place, unchanged, until one of the following events occurs:
    1. Either BUYCO or SELLCO offset all or part of their open long/short position, thus reducing their initial margin requirement, or;
    2. The April long/short position becomes a current month position on April 1st, or;
    3. Initial margin rates change (typically once a month).

For the simplicity of the discussion, we will assume the trade is the only position BUYCO and SELLCO have.

### *March 27 to March 31, 2017 - Margin* Requirements

- The following table illustrates the margin requirements for the April position through each remaining day in March:

| DATE | Settlement Price | BUYCO MTM | SELLCO MTM | BUYCO Initial Margin | SELLCO Initial Margin |
|---|---|---|---|---|---|
| March 27th | 3.100 | $15,000 | ($15,000) | ($45,000) | ($45,000) |
| March 28th | 3.250 | $37,500 | ($37,500) | ($45,000) | ($45,000) |
| March 29th | 3.200 | $30,000 | ($30,000) | ($45,000) | ($45,000) |
| March 30th | 3.000 | $0.00 | $0.00 | ($45,000) | ($45,000) |
| March 31st | **2.900** | ($15,000) | $15,000 | ($45,000) | ($45,000) |

***April 1 to April 30, 2017 - BUYCO's Margin Requirements***

- The following table illustrates the margin requirements for the April position through each remaining day in April:

| DATE | RM – April Settlement Price | BUYCO AP / AR | BUYCO RM Initial Margin* | BUYCO Variation Margin | BUYCO Total Margin |
|---|---|---|---|---|---|
| April 1st | 2.800 | $0 | ($45,000) | ($30,000) | ($75,000) |
| April 2nd | 2.750 | ($15,000) | ($43,500) | ($36,250) | ($94,750) |
| April 3rd | 2.900 | ($30,000) | ($42,000) | ($14,000) | ($86,000) |
| April 4th | 3.100 | ($45,000) | ($40,500) | $13,500 | ($72,000) |
| April 5th | 3.150 | ($60,000) | ($39,000) | $19,500 | ($79,500) |
| April 30th | 3.500 | ($435,000) | ($1,500) | $2,500 | ($434,000) |
| May 1st | **3.500** | ($450,000) | $0.00 | $0.00 | ($450,000) |

***April 1 to April 30, 2017 – SELLCO's Margin Requirements***

- The following table illustrates SELLCO's margin requirements for the April position through each remaining day in April:

| DATE | RM – April Settlement Price | SELLCO AP / AR | SELLCO RM Initial Margin* | SELLCO Variation Margin | SELLCO Total Margin |
|---|---|---|---|---|---|
| April 1st | 2.800 | $0 | ($45,000) | $30,000 | ($15,000) |
| April 2nd | 2.750 | $15,000 | ($43,500) | $36,250 | $7,750 |
| April 3rd | 2.900 | $30,000 | ($42,000) | $14,000 | $2,000 |
| April 4th | 3.100 | $45,000 | ($40,500) | ($13,500) | ($9,000) |
| April 5th | 3.150 | $60,000 | ($39,000) | ($19,500) | ($1,500) |
| April 30th | 3.500 | $435,000 | ($1,500) | ($2,500) | $431,000 |
| May 1st | 3.500 | $450,000 | $0.00 | $0.00 | $450,000 |

## 4.6. Margin Example 2 (Power – Daily-Settle Financial)

The following example illustrates how ICE NGX's margin model applies to a specific set of trades.

***Example Trade***

- On March 27, 2017, BUYCO (buyer) purchases 50 MW of Alberta Flat hours for month of April 2017 financial contract from SELLCO (seller) at a price of CAD $60.00/MWh.

***Position Management***

- As soon as the transaction is matched, BUYCO shows a net long position of 50 MW per hour for each day from April 1 to April 30, 2017, thus a total net long position of 36,000 MWh

  *(50 MW x 24 hours/day x 30 days).*

- Conversely, SELLCO shows a net short position of 50 MW per hour for each day from April 1 to April 30, 2017, thus a total net short position of 36,000 MWh (50 MW x 24 hours/day x 30 days).

***Initial Margin***

- Immediately following the creation of the long and short positions, initial margin is applied.
- Initial margin calculation will be applied at the portfolio level. All Alberta power positions that qualify ICE NGX's portfolio margining standards will be considered together.
- The initial margin requirement will remain in place, unchanged, until one of the following events occurs:

1. Either BUYCO or SELLCO offset all or part of their open long/short position, thus reducing their initial margin requirement, or;
2. The April long/short position becomes a current month position on April 1st, or;
3. Initial margin rates change (typically once a month).

For the simplicity of the discussion, we will assume the trade is the only position BUYCO and SELLCO have.

***March 27 to March 31, 2017 - Margin Requirements***

- The following table illustrates the margin requirements for the April position through each remaining day in March:

| DATE | Settlement Price | Daily MTM T-0 | Daily MTM T-1 | Daily MTM T-2 | BUYCO MTM (T-0 to T-2) | SELLCO MTM (T-0 to T-2) | BUYCO Initial Margin | SELLCO Initial Margin |
|---|---|---|---|---|---|---|---|---|
| March 27th | $61.00 | $36,000 | N/A | N/A | $36,000 | ($36,000) | ($360,000) | ($360,000) |
| March 28th | $65.00 | $144,000 | $36,000 | N/A | $180,000 | ($180,000) | ($360,000) | ($360,000) |
| March 29th | $60.50 | ($162,000) | $144,000 | $36,000 | $18,000 | ($18,000) | ($360,000) | ($360,000) |
| March 30th | $60.00 | ($18,000) | ($162,000) | $144,000 | ($36,000) | $36,000 | ($360,000) | ($360,000) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| March 31st | $50.00 | ($360,000) | ($18,000) | ($162,000) | ($540,000) | $540,000 | ($360,000) | ($360,000) |

Notes:

- Daily MTM represents gains and losses occurring during respective trading day, where T-0 is current day, T-1 is yesterday, T-2 is second preceding day. Total MTM is the sum of the two outstanding daily invoices (T-1 and T-2) and current day MTM (T-0). Invoices are paid on second day following the trading date gains and losses generated.

***April 1 to April 30, 2017 – BUYCO's Margin Requirements***

- The following table illustrates BUYCO's margin requirements for the April position through each remaining day in April:

| DATE | RM – April Settlement Price | Daily MTM T-0 | Daily MTM T-1 | Daily MTM T-2 | BUYCO Variation Margin | BUYCO Initial Margin | BUYCO Total Margin |
|---|---|---|---|---|---|---|---|
| April 1st | $51.00 | $36,000 | ($360,000) | ($18,000) | ($342,000) | ($1,440,000) | ($1,782,000) |
| April 2nd | $53.00 | $69,600 | $36,000 | ($360,000) | ($254,400) | ($1,392,000) | ($1,646,400) |
| April 3rd | $56.00 | $100,800 | $69,600 | $36,000 | $206,400 | ($1,344,000) | ($1,137,600) |
| April 4th | $55.00 | ($32,400) | $100,800 | $69,600 | $138,000 | ($1,296,000) | ($1,158,000) |
| April 5th | $59.00 | $124,800 | ($32,400) | $100,800 | $193,200 | ($1,248,000) | ($1,054,800) |
| April 30th | **$65.00** | ($6,000) | ($7,200) | $15,000 | $1,800 | ($48,000) | ($46,200) |

***April 1 to April 30, 2017 – SELLCO's Margin Requirements***

- The following table illustrates SELLCO's margin requirements for the April position through each remaining day in April:

| DATE | RM – April Settlement Price | Daily MTM T-0 | Daily MTM T-1 | Daily MTM T-2 | SELLCO Variation Margin | SELLCO Initial Margin | SELLCO Total Margin |
|---|---|---|---|---|---|---|---|
| April 1st | $51.00 | ($36,000) | $360,000 | $18,000 | $342,000 | ($1,440,000) | ($1,098,000) |
| April 2nd | $53.00 | ($69,600) | ($36,000) | $360,000 | $254,400 | ($1,392,000) | ($1,137,600) |
| April 3rd | $56.00 | ($100,800) | ($69,600) | ($36,000) | ($206,400) | ($1,344,000) | ($1,550,400) |
| April 4th | $55.00 | $32,400 | ($100,800) | ($69,600) | ($138,000) | ($1,296,000) | ($1,434,000) |
| April 5th | $59.00 | ($124,800) | $32,400 | ($100,800) | ($193,200) | ($1,248,000) | ($1,441,200) |
| April 30th | **$65.00** | $6,000 | $7,200 | ($15,000) | ($1,800) | ($48,000) | ($49,800) |

Notes:

- This exhibit assumes current month initial margin rates is $40/MWh.

# 5. Further Information

## 5.1. Clearing Contact Information

For Risk related questions, please email ICENGX-Risk@ice.com

For Clearing related questions, please email **Operations-ICENGX-Clearing@ice.com**.

## 5.2. General Contact Information

For further information, please contact the ICE NGX Help Desk at (403) 974-4357, or see the ICE NGX website at www.ice.com/ngx/clearing-settlement.

# 6. Abridged Revision History

| Version | Date | Issued By / Revised By | Comments |
|---|---|---|---|
| 2.7 | January 2, 2025 | CRO | Streamlining for readability |
| 2.7.1 | January 24, 2025 | General Counsel & CCO | Formatting changes |
| 2.7.2 | February 19, 2025 | General Counsel & CCO | Conforming changes |